

The Health Consequences of SMOKING

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Health Services and Mental Health Administration

The
Health Consequences
of Smoking

January 1973

**U.S. DEPARTMENT OF HEALTH,
EDUCATION, AND WELFARE
Public Health Service**

For sale by the Superintendent of Documents
U.S. Government Printing Office, Washington, D.C. 20402
Price \$1.85 domestic postpaid or \$1.50 GPO Bookstore
Stock Number 1723-00064



Preface

This report is the seventh in a series issued by the Public Health Service reviewing and assessing the scientific evidence linking cigarette smoking to disease and premature death. The current report reiterates, strengthens, and extends the findings in earlier reports that cigarette smoking is a major health problem in the United States.

The evidence has broadened dramatically in recent years. A Public Health Service assessment of evidence available in 1959 was largely focused on the relationship of cigarette smoking and lung cancer. The first formal report on this subject in 1964 found that cigarette smoking was not only a major cause of lung cancer and chronic bronchitis, but was associated with illness and death from chronic bronchopulmonary disease, cardiovascular disease, and other diseases.

The 1973 report confirms all these relationships and adds new evidence in other areas as well. The evidence in the chapter on pregnancy strongly indicates a causal relationship between cigarette smoking during pregnancy and lower infant birth weight and a strong, probably causal, association between cigarette smoking and higher late fetal and neonatal mortality. Also reported is the convergence of other evidence which suggests that cigarette smoking during pregnancy interacts with other risk factors to increase the risk of an unfavorable outcome of pregnancy for certain women more than others.

For the first time in this series of reports, a separate chapter is devoted to pipe and cigar smoking and the health hazards involved. Included is an assessment of the health implications of the new small cigars which look like cigarettes.

A final chapter, new to the reports, concerns cigarette smoking and exercise performance. A review of a number of fitness tests comparing smokers to nonsmokers indicates that cigarette smoking impairs exercise performance for many types of athletic events and activities involving maximal work capacity.

The interrelationships of smoking and health are no less complex today than they were reported to be in the 1964 report. But since that time we have greatly broadened our knowledge and understanding of the problem. The current report symbolizes this progress.



MERLIN K. DUVAL, M.D.,
Assistant Secretary for Health.

DECEMBER 13, 1972.

Table of Contents

	Page
PREFACE.....	iii
TABLE OF CONTENTS.....	v
PREPARATION OF THE REPORT AND ACKNOWLEDGMENTS.....	vii
Chapter 1. Cardiovascular Diseases.....	xiii
Chapter 2. Nonneoplastic Bronchopulmonary Diseases.....	33
Chapter 3. Cancer.....	65
Chapter 4. Pregnancy.....	99
Chapter 5. Peptic Ulcer Disease.....	153
Chapter 6. Pipe and Cigar Smoking.....	167
Chapter 7. Exercise Performance.....	239
INDEX.....	251

Preparation of the Report and Acknowledgments

"Smoking and Health. Report of the Advisory Committee to the Surgeon General of the Public Health Service," subsequently referred to as the "Surgeon General's Report," was published in 1964. The National Clearinghouse for Smoking and Health, established in 1965, has the responsibility for the continuous monitoring, compilation, and review of the world's medical literature which bears upon the health consequences of smoking. As called for by Public Law 89-92, the following three reviews of the medical literature on the health consequences of smoking, which had come to the attention of the Clearinghouse since the original "Surgeon General's Report," were sent to the Congress:

1. "The Health Consequences of Smoking, A Public Health Service Review: 1967" (submitted July 1967).
2. "The Health Consequences of Smoking, 1968 Supplement to the 1967 PHS Review" (submitted July 1968).
3. "The Health Consequences of Smoking, 1969 Supplement to the 1967 PHS Review" (submitted July 1969).

Public Law 91-222 was signed into law on April 1, 1970, and called for an 18-month interval between the 1969 supplement and the next report. During this period, a comprehensive review of all of the medical literature available to the Clearinghouse relating to the health consequences of smoking was undertaken, with an emphasis upon the most recent additions to the literature. The product of this review was: "The Health Consequences of Smoking, A Report of the Surgeon General: 1971," submitted to the Congress in January of 1971. Subsequently, a review of the medical literature in the field, which had come to the attention of the Clearinghouse since the publication of the 1971 report, was published as, "The Health Consequences of Smoking, A Report of the Surgeon General: 1972," submitted in January of 1972.

Every report published since the original "Surgeon General's Report" has contained a review of the medical literature relevant to the association between smoking and cardiovascular disease, nonneoplastic bronchopulmonary disease, and cancer. Several of the reports included reviews of the relationship between smoking and peptic ulcer disease (1967, 1971, 1972) and cigarette smoking and pregnancy (1967, 1969, 1971, 1972). Other topics relating to the use of tobacco have received special emphasis in single reports:

1. Tobacco Amblyopia (1971 Report).
2. Allergy (1972 Report).
3. Public Exposure to Air Pollution From Tobacco Smoke (1972 Report).
4. Harmful Constituents of Cigarette Smoke (1972 Report).
5. Noncancerous Oral Disease (1969 Report).

The present document, "The Health Consequences of Smoking: 1973," includes reviews of the relationships between smoking and cardiovascular disease, bronchopulmonary disease, cancer, and peptic ulcer disease which are based upon medical literature which has become available to the Clearinghouse since the publication of the 1972 report. It also includes special reviews of the health consequences of pipe and cigar smoking and of the relationship between cigarette smoking and the outcomes of pregnancy. The material in these two latter chapters reflects a comprehensive review of the pertinent world medical literature which has come to the attention of the Clearinghouse since the publication of the original "Surgeon General's Report," including material which has become available since the 1972 report. The final chapter in this year's report is a review of the relationship between smoking and exercise performance, an area not covered previously in any report.

With the exception of "Chapter 4, Pregnancy," each chapter is organized in a similar fashion. The introduction to each chapter is a summary of the work reviewed in previous reports. The summary of each chapter encompasses only the work which has most recently become available to the Clearinghouse. The pregnancy chapter is organized into separate sections according to several different outcomes of pregnancy. Each section includes a brief review of previously reported work and contains its own separate summary, in place of an overall summary for the entire chapter.

The preparation of this report was accomplished in the following fashion :

1. The continuous monitoring and compilation of the medical literature on the health consequences of smoking was accomplished through several mechanisms.
 - (a) An information science corporation is on contract to extract articles on smoking and health from the medical literature of the world. This organization provides a semimonthly accessions list with abstracts and copies of the various articles. Translations are called for as needed. Articles are classified according to subject and filed by a series of code words and phrases.
 - (b) The National Library of Medicine, through the Medlars system, sends the National Clearinghouse for Smoking and Health a monthly listing of articles in the smoking and health area. These are reviewed, and articles not identified by the information science corporation are ordered.
 - (c) Staff members review current medical literature and identify pertinent articles.
2. The first drafts of the individual chapters were sent to reviewers for criticism and comment with respect to the articles reviewed, articles not included, and conclusions. The drafts were then revised until they met with the general approval of the reviewers. The final drafts were reviewed as a whole by the Director of the National Clearinghouse for Smoking and Health, the Director of the National Cancer Institute, the Director of the National Heart and Lung Institute, the Director of the National Institute of Environmental Health Sciences, the Surgeon General, and by additional experts both within and outside of the Public Health Service.

Acknowledgments

The National Clearinghouse for Smoking and Health, Daniel Horn, Ph. D., Director, was responsible for the preparation of this report. Medical Staff Director for the report was Elvin E. Adams, M.D., Assistant Medical Staff Director was H. Stephen Williams, M.D. consulting editors were Daniel P. Asnes, M.D., David G. Cook, M.D., and John H. Holbrook, M.D.

The professional staff has had the assistance and advice of a number of experts in the scientific and technical fields, both in and outside the

Government. Their contributions are gratefully acknowledged. Special thanks are due the following:

- ANDERSON, WILLIAM H., M.D.—Chief, Pulmonary Section, School of Medicine, University of Louisville, Louisville, Ky.
- AUERBACH, OSCAR, M.D.—Senior Medical Investigator, Veterans Administration Hospital, East Orange, N.J.
- AYRES, STEPHEN M., M.D.—Director, Cardiopulmonary Laboratory, Saint Vincent's Hospital and Medical Center of New York, New York, N.Y.
- BOCK, FRED G., Ph. D.—Director, Orchard Park Laboratories, Roswell Park Memorial Institute, Orchard Park, N.Y.
- BOREN, HOLLIS G., M.D.—Medical Investigator, Veterans Administration Hospital, Tampa, Fla.
- BOUTWELL, ROSWELL K., M.D.—Professor of Oncology, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison, Wis.
- BROSS, IRWIN, M.D.—Director of Biostatistics, Roswell Park Memorial Institute, Buffalo, N.Y.
- COOPER, THEODORE, M.D.—Director, National Heart and Lung Institute, National Institutes of Health, Bethesda, Md.
- EPSTEIN, FREDERICK H., M.D.—Director and Professor of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Mich.
- FALK, HANS L., Ph. D.—Associate Director for Program, National Institute of Environmental Health Sciences, Research Triangle Park, N.C.
- FERRIS, BENJAMIN G., Jr., M.D.—Professor of Environmental Health and Safety, School of Public Health, Harvard University, Boston, Mass.
- FRAZIER, TODD M.—Assistant Director, Harvard Center for Community Health and Medical Care, School of Public Health, Harvard University, Boston, Mass.
- FRESTON, JAMES, M.D.—Associate Professor of Medicine, Head, Division of Gastroenterology, University of Utah Medical School, Salt Lake City, Utah.
- GOLDSMITH, JOHN R., M.D.—Head, Environmental Epidemiology Unit, Bureau of Occupational Health and Environmental Epidemiology, California State Department of Public Health, Berkeley, Calif.
- GORI, GIO BATTÀ, M.D.—Associate Scientific Director for Program, Division of Cancer Cause and Prevention, National Cancer Institute, Bethesda, Md.
- HIGGINS, IAN T. T., M.D.—Professor of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Mich.
- HOFFMANN, DIETRICH, Ph. D.—Chief, Division of Environmental Carcinogenesis, American Health Foundation, New York, N.Y.
- KELLER, ANDREW Z., D.M.D.—Chief, Research in Geographic Epidemiology, Veterans Administration Central Office, Washington, D.C.
- KIRSNER, JOSEPH B., M.D., Ph. D.—Chief of Staff and Deputy Dean for Medical Affairs, The Pritzker School of Medicine, University of Chicago Hospitals and Clinics, Chicago, Ill.
- KOLBYE, ALBERT C., Jr., M.D. J.D.—Deputy Director, Bureau of Foods, Food and Drug Administration, U.S. Department of Health, Education, and Welfare, Washington, D.C.
- KRUMHOLZ, RICHARD A., M.D.—Medical Director, Institute of Respiratory Diseases, Kettering Medical Center, Kettering, Ohio.
- LILIENTHAL, ABRAHAM, M.D.—Professor and Chairman, Department of Epidemiology, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Md.
- MCLEAN, ROSS, M.D.—Professor of Medicine, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, N.C.

McMILLAN, GARDNER C., M.D.—Chief, Arteriosclerotic Disease Branch, National Heart and Lung Institute, National Institutes of Health, Bethesda, Md.

MACMAHON, BRIAN, M.D.—Professor of Epidemiology, School of Public Health, Harvard University, Boston, Mass.

MEYER, MARY B., M.S.—Assistant Professor of Epidemiology, The Johns Hopkins University, Baltimore, Md.

MITCHELL, ROGER S., M.D.—Chief of Staff, Veterans Administration Hospital, Denver, Colo.

MURPHY, EDMOND A., M.D., Sc. D.—Associate Professor of Medicine and Biostatistics, The Johns Hopkins Hospital, Baltimore, Md.

NETTESHEIM, PAUL, M.D.—Group Leader, Respiratory Carcinogenesis, Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tenn.

PAFFENBARGER, RALPH S., JR., M.D.—Chief Epidemiology Section, Bureau of Adult Health and Chronic Diseases, California State Department of Public Health, Berkeley, Calif.

PETERSON, WILLIAM F., M.D.—Chairman, Department of Obstetrics and Gynecology, Washington Hospital Center, Washington, D.C.

PETTY, THOMAS L., M.D.—Associate Professor of Medicine and Head, Division of Pulmonary Diseases, University of Colorado Medical Center, Denver, Colo.

RALL, DAVID P., M.D.—Director, National Institute of Environmental Health Sciences, Research Triangle Park, N.C.

RAUSCHER, FRANK J., M.D.—Director, National Cancer Institute, National Institutes of Health, Bethesda, Md.

REINKE, WILLIAM A. Ph. D.—Professor, Department of International Health, The Johns Hopkins University, Baltimore, Md.

RENZETTI, ATTILIO D., JR., M.D.—Professor of Medicine, Pulmonary Disease Division, University of Utah Medical Center, Salt Lake City, Utah.

ROBINS, MORTON—Chief of Study, Design, and Analysis Staff, Regional Medical Programs Service, Health Services and Mental Health Administration, Rockville, Md.

SAFFIOTTI, UMBERTO, M.D.—Associate Scientific Director for Carcinogenesis, Division of Cancer Cause and Prevention, National Cancer Institute, National Institutes of Health, Bethesda, Md.

SCHUMAN, LEONARD M., M.D.—Professor and Head, Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minn.

SHIMKIN, MICHAEL B., M.D.—Professor of Community Medicine and Oncology and Coordinator, Regional Medical Program, University of California at San Diego, La Jolla, Calif.

STAMLER, JEREMIAH, M.D.—Professor and Chairman, Department of Community Health and Preventive Medicine, Northwestern University, Chicago, Ill.

VAN DUUREN, BENJAMIN L., M.D.—Professor of Environmental Medicine, Institute of Environmental Medicine, New York University Medical Center, New York, N.Y.

WYNDE, ERNEST L., M.D.—President, American Health Foundation, New York, N.Y.

The following additional staff members of the National Clearinghouse for Smoking and Health contributed to the preparation of this report: Richard H. Amacher, Marjorie L. Brigham, Emil Corwin, Lillian Davis, Gertrude P. Herrin, Robert S. Hutchings, Jennie M. Jennings, Nancy S. Johnston, Dan Nemzer, Mildred Ritchie, James A. Robertson, Donald R. Shopland, and Kathleen H. Smith.